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PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Improvements relating to Vehicle Road Wheel Suspension

We, DAIMLER-BENZ AKTIENGESELLSCHAFT, of Stuttgart-Untertürkheim, Germany, a Company organised under the laws of Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention concerns improvements relating to the road-wheel suspension systems of vehicles, particularly but not necessarily of motor vehicles.

Particularly for the front axles of motor vehicles, it is desirable that the instantaneous centre of rotation of the vehicle body, about a longitudinal axis of the vehicle, in relation to the wheels should be as high as possible. With known suspension systems in which this requirement is satisfied, the variations of camber and track width on deflection of the two wheels of an axle in the same direction are comparatively large. The wheel suspension according to the invention seeks to obviate this disadvantage.

According to the invention, in a vehicle wheel-suspension system, the axle carrier for each of the front and/or rear wheels is guided at an upper joint and at a lower joint connected to the lower joint for the opposite wheel by a rigid transverse member which is mounted so as to be rockable about an axis fixed in relation to the vehicle frame or body and extending in the central longitudinal vertical plane of the vehicle and is also displaceable parallel to itself, the perpendiculars to the instantaneous directions of movement of the said lower and upper joints in the normal position of the said system intersecting in a point which lies on the far side of the said plane and higher than the said axis.

With this suspension system, on deflection of the two wheels in the same direction, for example on travelling over an undulation, there is no variation, or practically no variation, in the track or camber. On the other hand, the suspension system has a high instantaneous centre.

The upper joints may be disposed at the ends of transverse links mounted on the vehicle frame or body. Alternatively, the upper joints may be sliding joints rockably mounted on the frame or body.

The rigid transverse member may be mounted on a longitudinally extending pivot by means of a vertical slide-guide arrangement. Alternatively it may be pivotally suspended from a link extending transversely from a longitudinally extending pivot, the said link being approximately horizontal when in its middle position, i.e. when neither of the two road wheels is deflected.

Practical arrangements in accordance with the invention are illustrated by way of example in the accompanying drawing, in which:—

Figure 1 is a more or less diagrammatic end elevation of a vehicle with one pair of wheels suspended according to the invention; the rigid transverse member in this example being guided in its up and down movements parallel to itself by having sliding engagement with a block which is rockable about the longitudinally extending pivot.

Figure 2 is similar to Figure 1 but illustrates a modification of the means for supporting the upper joints associated with the axle carriers, and

Figure 3 is a perspective diagrammatic view of a system in which the rigid transverse member is suspended from the longitudinally extending pivot by means of a linkage.

In Figures 1 and 2, a vehicle body 11 has mounted upon it, in its central longitudinal vertical plane 40, a pivot 12, the axis of which extends longitudinally of the vehicle. On the pivot 12 there is pivotally mounted a slide block 13, which can slide in a slot 14 formed in an upstanding arm 15 formed in one piece with, or rigidly connected to, a rigid transverse member 16, which is connected by

pivot joints 17 and 18 to stub axle carriers 19 and 20 of road wheels 21 and 22. In Figure 1, the upper pivots 23 and 24 for guidingly supporting the stub axle carriers 19 and 20 being slidable up and down in rockably mounted guides. Springing is effected by springs 25 and 26, disposed between the rigid transverse member 16 and the vehicle body 11.

On co-directional deflections of the two wheels 21 and 22, hence for example on travelling over an undulation in the ground, the wheels 21 and 22, the stub axle carriers 19 and 20, and the rigid transverse member 16 together with the upstanding arm 15, move vertically upward against the restoring force of the springs 25 and 26. In these circumstances, as will be immediately apparent from Figure 1, no track or camber changes occur.

In the case of deflections of the two wheels 21, 22 in opposite directions, or of the deflection of one wheel only, as when one of the wheels 21 or 22 travels over an obstacle, there is a relative rotation of the transverse member 16 in relation to the vehicle body 11. The chain-dotted lines in the drawing show how the instantaneous centre MZ for this rotary movement is to be found. This instantaneous centre lies relatively high, this being very desirable especially in the case of front axles, for example for the purpose of reducing the turning moment produced by centrifugal force on rounding curves, which force tends to tip the vehicle body towards the outside of the curve. The construction according to the invention thus combines the advantages of a high position of the instantaneous centre above the road with the advantages that no track and camber changes occur on co-directional deflections of the wheels.

Figure 2 differs from Figure 1 in that transverse links 27 and 28 are used instead of the rockable sliding joints 23 and 24. Constructionally, such links may in certain circumstances be more favourable than rockable sliding joints. On the other hand, slight track and camber changes on the co-directional deflection of the two wheels 21, 22 may not be completely avoidable with this construction.

In Figure 3, the slide block guide of the rigid transverse member 16 in Figures 1 and 2 has been replaced by a linkage, for on the longitudinally extending pivot there is mounted a transverse link 29, which in the middle position (i.e. when neither of the wheels 21 or 22 is deflected) extends approximately horizontally and which is articulated in a joint 30 on the rigid transverse member 16 or on an upwardly extending arm 31 rigidly disposed thereon. In this construction, transverse links 27 and 28 are likewise provided for the guidance of the upper pivots associated with the stub axle carriers 19 and 20 and are directly connected to one of the ends of torsion rod springs 32 and 33. The torsion rod springs have their opposite ends clamped fast on the vehicle body or frame at 34 and 35. The mode of operation of the suspension system shown in Figure 3 differs only insignificantly from that of the systems shown in Figures 1 and 2.

As illustrated by chain lines in Figure 1, the system has the characteristic that the perpendiculars 41, 42 to the instantaneous directions of movement of the upper and lower joints 23, 17 in the illustrated normal position of the system intersect at a point 45 which lies on the far side of the plane 40 and higher than the axis of the pivot 12. The same characteristic is possessed by the systems of Figures 2 and 3.

WHAT WE CLAIM IS:—

1. A vehicle-wheel suspension system, wherein the axle carrier for each of the front and/or rear wheels is guided at an upper joint and at a lower joint connected to the lower joint for the opposite wheel by a rigid transverse member which is mounted so as to be rockable about an axis fixed in relation to the vehicle frame or body and extending in the central longitudinal vertical plane of the vehicle and is also displaceable parallel to itself, the perpendiculars to the instantaneous directions of movement of the said lower and upper joints in the normal position of the said system intersecting in a point which lies on the far side of the said plane and higher than the said axis.

2. A system according to Claim 1, wherein the upper joints are sliding joints rockably mounted on the vehicle frame or body.

3. A system according to Claim 1, wherein the upper joints are disposed at the ends of transverse links mounted on the vehicle frame or body.

4. A system according to any one of Claims 1 to 3, wherein the rigid transverse member is mounted on a longitudinally extending pivot by means of a vertical slide-guide arrangement.

5. A system according to any one of Claims 1 to 3, wherein the rigid transverse member is pivotally suspended from a link which extends transversely from a longitudinally extending pivot.

6. A vehicle wheel suspension system substantially as hereinbefore described with reference to Figure 1, or Figure 2, or Figure 3 of the accompanying drawing.

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840,583 COMPLETE SPECIFICATION
1 SHEET
This drawing is a reproduction of the Original on a reduced scale.

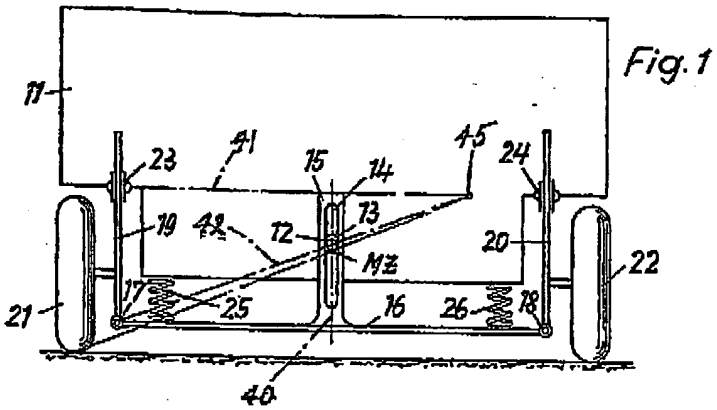

Fig. 1

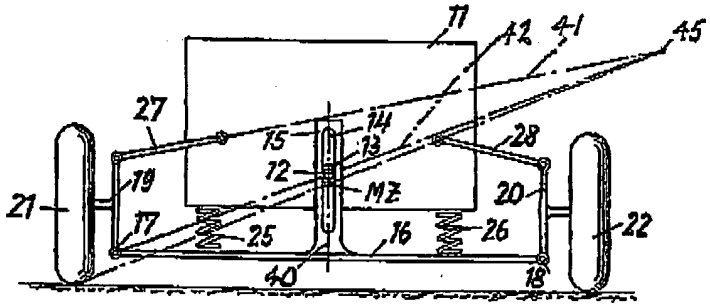

Fig.2

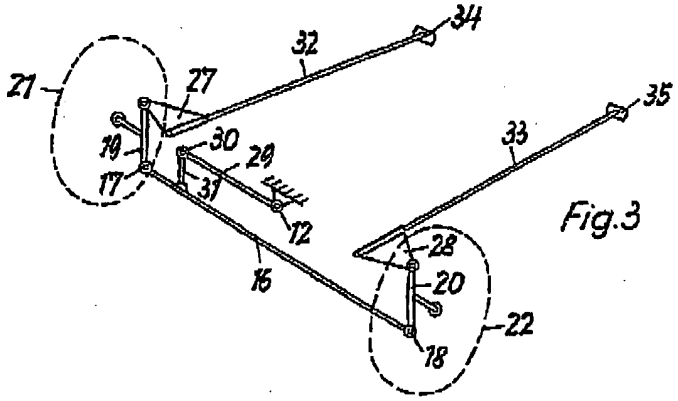

Fig.3